

SEQUENCE LISTING

<110> Gillies, Stephen  
Lo, Kin Ming

<120> Multiple Cytokine Protein Complexes

<130> LEX-010

<140>  
<141>

<150> 60/147,924

<151> 1999-08-09

<160> 32

<170> PatentIn Ver. 2.0

<210> 1

<211> 582

<212> DNA

<213> Mus musculus

<220>

<223> Description of Artificial Sequence: murine p35  
coding sequence for mature protein

<400> 1

agggttcattc cagtctctgg acctgccagg tgtcttagcc agtcccggaaa cctgctgaag 60  
accacagatg acatggtaaa gacggccaga gaaaaactga aacattattc ctgcactgct 120  
gaagacatcg atcatgaaga catcacacgg gaccaaaccga gcacattgaa gacctgttt 180  
ccactggAAC tacacaagaa cgagagtgc ctggctacta gagagacttc ttccacaaca 240  
agagggagct gcctgcccc acagaagacg tcttgatga tgaccctgtg ctttgttagc 300  
atctatgagg acttgaagat gtaccagaca gagtccagg ccataaacgc agcacttcag 360  
aatcacaacc atcagcagat cattctagac aaggcatgc tggtgccat cgatgagctg 420  
atgcagtctc tgaatcataa tggcgagact ctgcggcaga aacctcctgt gggagaagca 480  
gacccttaca gagtggaaat gaaagctctgc atcctgcttc acgccttcag caccgcgtc 540  
gtgaccatca acagggttat gggctatctg agctccgcct ga 582

<210> 2

<211> 1472

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: murine  
p40-IL-2 fusion protein coding sequence

<400> 2

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ttttgctgt gtctccactc atggccatgt gggagctgaa gaaagacgtt tatgtttag 120  
aggtggactg gactcccgat gcccctggag aaacagtgaa cctcacctgt gacacgcctg 180  
aagaagatga catcacctgg acctcagacc agagacatgg agtcataggc tctggaaaga 240  
ccctgaccat cactgtcaaa gagtttctag atgtggcca gtacacctgc cacaaggag 300  
gcgagactct gagccactca catctgctgc tccacaagaa ggaaaatgga atttggtcca 360  
ctgaaattt aaaaaatttc aaaaacaaga ctttcctgaa gtgtgaagca ccaaattact 420

ccggacggtt cacgtgetca tggctggc aaagaaaacat ggacttgaag ttcaacatca 480  
agagcagtag cagttccc gactctcggt cagtgcacatg tgaatggcg tctctgtctg 540  
cagagaaggta cacactggac caaaggact atgagaagta ttcatgtcc tgccaggagg 600  
atgtcacctg cccaactgcc gaggagacc tgccattga actggcggtt gaagcacggc 660  
agcagaataa atatgagaac tacagcacca gcttcttcat cagggacatc atcaaaccag 720  
acccggccaa gaacttgcag atgaagcatt tgaagaactc acaggtggag gtcagctggg 780  
atgaccctga ctccctggagc actccccatt cctacttctc cctcaagttc tttgttcgaa 840  
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ctcaggatcg ctattacaat tcctcatgca gcaagtgcc atgtttccc tgcagggtcc 1020  
gateccccggg taaagcaccctt acttcaagct ctacagcgga agcacagcag cagcagcagc 1080  
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gcaggatggc gaattacagg aacctgaaac tccccaggat gtcacatc aaattttact 1200  
tgcccaagca gcccacagaa ttgaaagatc ttcatgtcc taaagatgaa cttggacctc 1260  
tgcggcatgt tctggattt actcaaagca aaagcttca attggaagat gctgagaatt 1320  
tcatcagcaa ttcagatgtt actgttgc aactaaaggg ctctgacaac acatttgagt 1380  
gccaatttca gcatgttgc gcaactgtgg tggacttctt gaggagatgg atagccttct 1440  
gtcaaaatcat catctcaaca agccctcaat aa 1472

<210> 3

<211> 1409

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: murine  
p40-GM-CSF fusion protein coding sequence

<400> 3

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ttttgttgtt gtctccactc atggccatgt gggagcttgc gaaagacgtt tatgttgttag 120  
aggtggactg gactcccgat gcccctggag aaacagtggaa cctcacatgt gacacgcctg 180  
aagaagatga catcacatgg acctcagacc agagacatgg agtcataggg tctggaaaga 240  
ccctgaccat cactgtcaaa gagtttctag atgctggcca gtacacatgc cacaaggagg 300  
gcgagactct gagccactca catctgctgc tccacaagaa ggaaaatggaa atttggtcca 360  
ctgaaaatttt aaaaatttc aaaaacaaga ctttctgaa gtgtgaagca ccaaattact 420  
ccggacggtt cacgtgtca tggctggc aaagaaaacat ggacttgaag ttcaacatca 480  
agagcagtag cagttccc gactctcggt cagtgcacatg tgaatggcg tctctgtctg 540  
cagagaaggta cacactggac caaaggact atgagaagta ttcatgtcc tgccaggagg 600  
atgtcacctg cccaactgc gaggagacc tgccattga actggcggtt gaagcacggc 660  
agcagaataa atatgagaac tacagcacca gcttcttcat cagggacatc atcaaaccag 720  
acccggccaa gaacttgcag atgaagcatt tgaagaactc acaggtggag gtcagctggg 780  
atgaccctga ctccctggagc actccccattt cctacttctc cctcaagttc tttgttcgaa 840  
tcctcgccaa gaaagaaaaag atgaaggaga cagaggagg gtgttaaccag aaaggtgcgt 900  
tcctcgtaga gaagacatct accgaaatgc aatgccaaagg cggaaatgtc tgcgtgdaag 960  
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gateccccggg aaaaacccccc gcccgcctc ccataattgt taccggccatg 1080  
tagaggccat caaaacccccc tggatgacat gcctgtcactg ttgaatgaag 1140  
aggttagaagt cgtcttcaac gagtttcttcat tcaagaagct aacatgtgtt cagacccggcc 1200  
tgaagatatt cgagcagggt ctacggggca atttccacca actcaagggg gccttgaaca 1260  
tgacagccag ctactaccag acataactgc ccccaactcc ggaaacggac tttgtaaacac 1320  
aagtaccac ctatgcggat ttcatagaca gccttaaaac ctttctgact gatatccccct 1380  
ttgaatgcaaaaatcat caaaaatga 1409

<210> 4

<211> 1389

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: human  
p40-IL-2 fusion protein coding sequence

<400> 4

atgtgtcacc agcagtttgtt catctcttgg ttttcctgg tttttctggc atctcccttc 60  
gtggccatat gggaaactgaa gaaagatgtt tatgtcgttag aattggattt gtatccggat 120  
gccctggag aaatgggtt cctcacctgt gacaccctg aagaagatgg tattcacctgg 180  
accttggacc agagcagtga ggtcttaggc tctggaaaa ccctgaccat ccaagtc当地 240  
gagtttgag atgctggcca gtacacctgt cacaaaggag gcgagggttct aagccattcg 300  
ctcctgctgc ttccaaaaaa ggaagatggg atttggtcca ctgatatttt aaaggaccag 360  
aaagaaccca aaaataagac ctttctaaga tgccggcca agaattattt tggacgtttc 420  
acctgttgtt ggctgacgac aatcagtact gatttgacat tcagtgtcaa aagcagcaga 480  
ggcttctctg acccccaagg ggtgacgtgc ggagctgta cactctctgc agagagagtc 540  
agaggggaca acaaggagta tgagtactca gtggagtgc aggaggacag tgccctgccc 600  
gctgctgagg agagtctgcc cattgagggtc atgggtggat ccgttccaaa gctcaagtat 660  
gaaaactaca ccagcagctt cttcatcagg gacatcatca aacctgacc acccaagaac 720  
ttgcagctga agccattaaa gaattctcg caggtggagg tcagctgggta gtaccctgac 780  
acctggagta ctccacattc ctacttctcc ctgacatttcc gcttcaggtt ccaggcgaag 840  
agcaagagag aaaagaaaaga tagagtcttc acggacaaga cctcagccac ggtcatctgc 900  
cgaaaaatg ccagcattag cgtcgcccc caggaccgt actatagctc atcttggagc 960  
gaatggcat ctgtgccttg cagtgcaccc acttcaagtt ctacaaagaa aacacagcta 1020  
caactggacg atttactgtt ggatttacag atgattttga atgaaattaa taattacaag 1080  
aatcccaaac tcaccaggat gtcacattt aagtttaca tgcccaagaa ggccacagaa 1140  
ctgaaacatc ttcaagtgtct agaagaagaa ctcaaacctc tggaggaagt gctaaattta 1200  
gctcaaagca aaaacttca cttaagaccc agggacttaa tcagcaatat caacgtaata 1260  
gttctggAAC taaagggttc tggaaacaaca ttcatgtgtt aatatgtctga tgagacagca 1320  
accattgttag aatttctgaa cagatggatt acctttgtc aaagcatcat ctcaacacta 1380  
acttgataa 1389

<210> 5

<211> 1278

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: murine  
Fc-p35 fusion protein coding sequence

<400> 5

gagcccacaaat caagccctgt cctccatgca aatgccacgc acctaaccctc 60  
ttgggtggac catccgtctt catcttccctt ccaaagatca aggtatgtact catgatctcc 120  
ctgagcccca tagtcacatg tgggtgggt gatgtgagcg aggtatgaccc agatgtccag 180  
atcagcttgtt ttgtgaacaa cgtggaaatgtt cacacagctc agacacaaaac ccataagagag 240  
gattacaaca gtactctccg ggtggtcagt gccctccca tccagcacca ggactggatg 300  
agtggcaagg agttcaaatg caaggtcaac aacaaagacc tcccagcgcc catcgagaga 360  
accatctcaa aacccaaagg gtcagtaaga gctccacagg tatatgtctt gcctccacca 420  
gaagaagaga tgactaagaa acaggtcaact ctgacccgtca tggtcacaga ctccatgcct 480  
gaagacattt acgtggagtg gaccaacaaac gggaaaacacg agctaaacta caagaacact 540  
gaaccagtcc tggactctga tgggtcttac ttcatgtaca gcaagctgag agtggaaaag 600  
aagaactggg tggaaagaaa tagtactcc tgggttgc tccacggagg tctgcacaat 660  
caccacacga ctaagagctt ctcccgaccc cgggttaggg tcattccagt ctctggaccc 720  
gccaggtgtc tttagccagtc cggaaacctg ctgaagacca cagatgacat ggtgaagacg 780  
gccagagaaa aactgaaaca ttattcctgc actgctgtt aatgtgttccatc tgaagacatc 840  
acacgggacc aaaccagcac attgaagacc tggtaaccac tggaaactaca caagaacgag 900

agttgcctgg ctactagaga gacttcttcc acaacaagag ggagctgcct gcccccacag 960  
aagacgtctt tcatgtgac cctgtgcctt ggttagcatct atgaggactt gaagatgtac 1020  
cagacagagt tccaggccat caacgcagca cttcagaatc acaaccatca gcagatcatt 1080  
ctagacaagg gcatgtcggt gcccattcgat gagctgatgc agtctctgaa tcataatggc 1140  
gagactctgc gccagaaaacc tcctgtggga gaagcagacc ctacagagt gaaaatgaag 1200  
ctctgcattcc tgcttcacgc cttcagcacc cgctcgta ccatcaacag ggtgatggc 1260  
tatctgagct ccgcctga 1278

<210> 6  
<211> 1287  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: human Fc-p35  
fusion protein coding sequence

<400> 6  
gagcccaaattt cttgtgacaa aactcacaca tgcccccgtt gcccaggcacc tgaactcttg 60  
gggggaccgtt cagtcttctt ctccccccaa aaacccaaagg acaccctcat gatctcccg 120  
acccctgagg tcacatgcgtt ggtgggtggac gtgagccacg aagaccctga ggtcaagttc 180  
aactggtacg tggacggcgtt ggagggtgtt aatgccaaga caaagcccgccgg 240  
tacaacagca cgttaccgtgtt ggtcagcgctt ctcaccgttcc tgaccaggat 300  
ggcaaggagt acaagtgcattt ggtctccaaac aaacccctcc cagccccat cggaaaaacc 360  
atctccaaagg ccaaaggggca gccccggagaa ccacaggtgtt acaccctgccc cccatcacgg 420  
gaggagatgatc ccaagaacca ggtcagcgctt acctgcctgg tcaaaggctt ctatcccacg 480  
gacatcgccg tggagttggatc gagcaatggg cagccggaga acaactacaa gaccacgcct 540  
ccctgtgtgg actccgcacgg ctcccttcttc ctctatagca agtccaccgtt ggacaagagc 600  
agggtggcagc aggggaacgtt ctctctatgc tccgtgtatgc atgaggctctt gcacaaccac 660  
tacacgcaga agaccccttc cctgtccccgg ggaagaaaacc tccccgtggc cactccacac 720  
ccaggaatgtt tcccatgcattt tcaccactcc caaaacctgc tgaggccgtt cagcaacatg 780  
ctccagaagg ccagacaaac ttcttgcattt tacccttgcattt ctctgtatgc gattgtatcat 840  
gaagatatca caaaagataaa aaccacgcata gttggaggcctt gtttaccattt ggaatttacc 900  
aagaatgaga gttgcctaaa ttccagagatc acctctttca taactaatgg gagttgcctg 960  
gcctccagaa agacccctttt tatgtatggcc ctgtgccttta gtatgtatcat tgaagacttg 1020  
aagatgtacc aggtggagttt caagaccatgtt aatgcataacc ttctgtatggatc tcctaagagg 1080  
cagatctttc tagatcaaaa catgctggca gtttattgtatgc agtctgtatgc ggcctgtatc 1140  
ttcaacagtgtt agactgtgcc accaaaaatcc tcccttgcattt aaccggattt ttataaaaact 1200  
aaaatcaagc tctgcataactt tttcatgtttt ttcagaatttcc gggcagtgtac tattgacaga 1260  
gtgacgagctt atctgtatgc ttccctaa 1287

<210> 7  
<211> 32  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: forward primer  
for construction of murine p40-IL-2 fusion  
protein

<220>  
<221> misc\_feature  
<222> (12)..(14)  
<223> translation initiation codon

<400> 7

aagcttagcac catgtgtccct cagaagctaa cc

32

<210> 8

<211> 27

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: reverse primer  
for construction of murine p40-IL-2 fusion  
protein

<220>

<221> misc\_feature

<222> Complement((7)..(9))

<223> translation stop codon

<400> 8

ctcgagctag gatcggaccc tgcaggg

27

<210> 9

<211> 31

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: DNA sequence  
at the junction of murine p40-IL-2 fusion protein

<220>

<221> misc\_feature

<222> (14)..(16)

<223> encodes the C-terminal amino acid residue of  
murine p40

<220>

<221> misc\_feature

<222> (26)..(28)

<223> encodes the N-terminal amino acid residue of  
mature murine IL-2

<400> 9

ctgcagggtc cgatccccgg gtaaaaggacc c

31

<210> 10

<211> 28

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: DNA sequence  
at the junction of single-chain murine IL12 and  
GMCSF

<220>

<221> misc\_feature

<222> (14)..(16)

<223> encodes the C-terminal amino acid residue of  
murine p40

<220>

<221> misc feature

<222> (26)..(28)

<223> encodes the N-terminal amino acid residue of  
mature murine GMCSF

<400> 10

ctgcagggtc cgatccccgg gaaaagca

28

<210> 11

<211> 2013

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: murine  
p35-linker-p40-IL-2 fusion protein coding sequence

<400> 11

agggtcattc cagtctctgg acctgccagg tgccttagcc agtccccaaa cctgctgaag 60  
accacagatg acatggtaa gacggccaga gaaaaactga aacattattc ctgcactgct 120  
gaagacatcg atcatgaaga catcacacgg gaccaaaccg gcacattgaa gacctgtta 180  
ccactggAAC tacacaagaa cgagagttgc ctggctacta gagagacttc ttccacaaca 240  
agagggagct gcctgcccccc acagaagacg tctttgtatgaa tgaccctgtg ccttggtagc 300  
atctatgagg acttgaagat gtaccagaca gagttccagg ccatcaacgc agcacttcag 360  
aatcacaacc atcagcagat cattcttagac aaggccatgc tggtgccat cgatgagctg 420  
atgcagtctc tgaatcataa tggcgagact ctgcgccaga aacctctgtt gggagaagca 480  
gacccttaca gagtggaaat gaagctctgc atcctgttc acgccttcag cacccgcgtc 540  
gtgaccatca acagggtgat gggctatctg agctccgcgt cgagcggggc cagcgggggc 600  
ggaggccagcg gcggggggcg atccggccatg tgggtgttgg agaaaagacgt ttatgttcta 660  
gaggtggact ggactcccgaa tgccctgttggaa gaaacagtga acctcacctg tgacacgcct 720  
gaagaagatg acatcacctg gacccctcagac cagagacatg gagtcataagg ctctgaaag 780  
accctgacca tcactgtcaa agatTTCTA gatgtgttgc agtacacactg ccacaaagga 840  
ggcgagactc tgagccactc acatctgtct ctccacaaga agaaaaatgg aatttggtcc 900  
actgaaattt taaaaattt caaaaacaag actttcttga agtgtgaagc accaaattac 960  
tccggacgggt tcacgtctc atggctgggtg caaagaaaaca tggacttggaa gttcaacatc 1020  
aagagcagta gcagttcccc ttgactctcg gcaagtgcgt gtggaaatggc gtctctgtct 1080  
gcagagaagg tcacacttggaa ccaaaggggac tatgagaagt attcagtgtc ctgcaggag 1140  
gatgtcacct gcccacttcg cgaggagacc ctgcccattt aactggcggtt ggaagcacgg 1200  
cagcagaata aatatgagaa ctacagcacc agtctttca tcagggacat catcaaacc 1260  
gaccggccca agaacttgcgatgaaaccc ttgaaactt cacagggtggaa ggtcagctgg 1320  
gagtaccctg actcctggag cactccccat tccctacttct ccctcaagtt ctttggtctga 1380  
atccagcgcgca agaaagaaaa gatgaaggag acagaggagg ggtgttaaccg gaaaggtgcg 1440  
ttcctcgtag agaagacatc taccgaagtc caatgcggaa gggggatgt ctgcgtgcaa 1500  
gctcaggatc gctattacaa ttccctcatgc agcaagtggg catgtgttcc ctgcagggtc 1560  
cgatccccgg gtaaagcacc cacttcaagc tctacagcgg aacgcacagca gcagcagcag 1620  
cagcagcagc agcagcagca gcacctggag cagctgttga tggacctaca ggagctcctg 1680  
agcaggatgg agaattacag gaaacctgaaa ctccccggaa tgctcacctt caaattttac 1740  
ttgccccaggc aggcacaga attgaaagat cttcagtgtcc tagaagatga acttgacact 1800  
ctgcggcatg ttctggattt gactcaaagc aaaagcttca aatttggaaaga tgctgagaat 1860  
ttcatcagca atatcagat aactgttggaa aaactaaagg gctctgacaa cacatttgag 1920  
tgccaattcg atgatgagtc agcaactgtg gtggacttcc tgaggagatg gatagccttc 1980  
tgtcaaagca tcatctcaac aagccctcaa taa

2013

<210> 12  
<211> 1569  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: murine  
p35-linker-p40 fusion protein coding sequence

<400> 12

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accacagatg acatggtaaa gacggccaga gaaaaactgaa aacattatttc ctgcactgct 120  
gaagacatcg atcatgaaga catcacacgg gaccaaaccg gcacattgaa gacctgttta 180  
ccactggAAC tacacaagaa cgagagttgc ctggctacta gagagacttc ttccacaaca 240  
agagggagct gcctggcccc acagaagacg tctttgatga tgaccctgtg cttggtagc 300  
atctatgagg acttgaagat gtaccagaca gagttccagg ccatcaacgc agcacttcag 360  
aatcacaacc atcagcagat cattctagac aagggcatgc tggccatcgatgactg 420  
atgcagtctc tgaatcataa tggcgagact ctgcggcaga aacctcctgt gggagaagca 480  
gacccttaca gagtggaaat gaagctctgc atcctgcttc acgccttcag caccggcgtc 540  
gtgaccatca acagggtgat gggctatctg agctccgcgt cgagcgggggg cagcgggggc 600  
ggagggcagcg gccccccatg atccgcctgg agaaaagacgt ttatgttga 660  
gaggtggact ggactcccga tgcccttggaa gaaacagtga acctcacctg tgacacgcct 720  
gaagaagatg acatcacctg gacccatcgac cagagacatg gagtcatagg ctctggaaag 780  
accctgacca tcactgtcaa agagttctca gatgctggcc agtacacactg ccacaaagga 840  
ggcgagactc tgagccactc acatctgctg ctccacaaga agaaaaatgg aatttggtcc 900  
actgaaattt taaaaaaattt caaaaacaag actttcctga agtgtgaagc accaaattac 960  
tccggacggt tcacgtgctc atggctggtg caaagaaaaca tgacttgaa gttcaacatc 1020  
aagagcgtt gcaagttcccc tgaactctcg gcaagtgcacat gtggaaatggc gtctctgtct 1080  
gcagagaagg tcacacttggaa cccaaaggac tatgagaagt attcagtgtc ctgcccaggag 1140  
gatgtcacct gcccactgc cgaggagacc ctgcccattt aactggcggtt ggaagcacgg 1200  
cagcagaata aatatgagaa ctacagcacc agtcttca tcaaggacat catcaaacca 1260  
gaccggccca agaacttgc gatgaaggct ttgaagaact cacaggttgg ggtcagctgg 1320  
gagtaaccctg actcctggag cactcccat tccctacttct ccctcaagtt ctttggcga 1380  
atccagcgcga agaaaagaaaa gatgaaggag acagaggagg ggtgttaaccg gaaagggtgcg 1440  
ttccctgttag agaagacatc taccgaagtc caatgcaaa gccccatgt ctgcgtgcaa 1500  
gctcaggatc gctattacaa ttccctcatgc agcaagtggg catgtgttcc ctgcagggtc 1560  
cgatccttag 1569

<210> 13  
<211> 2709  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: murine  
Fc-p35-linker-p40-IL-2 fusion protein coding  
sequence

<400> 13

gagcccagag ggcccaaat caagccctgt cctccatgca aatgcccagg acctaaccctc 60  
ttgggtggac catccgttccatcttccct cccaaagatca agatgtact catgatctcc 120  
ctgagccca tagtcacatg tgggtggtg gatgtgagcg agatgaccc agatgtccag 180  
atcagctgtt tggtaacaa cgtggaaatgta cacacagtc agacacaaac ccatacgagag 240  
gattacaaca gtactctccg ggtggtcagt gcccctccca tccagccatgaa ggactggatg 300  
agtggcaagg agtcaaatg caaggtcaac aacaaagacc tcccgccgc catcgagaga 360  
accatctcaa aacccaaagg gtcagtaaga gctccacagg tatatgttctt ccctccacca 420  
gaagaagaga tgactaagaa acaggtcaact ctgacccatgca tggtcacaga cttcatgcct 480

gaagacattt acgtggagt gaccaacaac gggaaaacag agctaaacta caagaacact 540  
 gaaccagtcc tggactctga tggttcttac ttcatgtaca gcaagctgag agtggaaaag 600  
 aagaactggg tggaaagaaa tagctactcc tggtagtgg tccacgaggg tctgcacaat 660  
 caccacacga ctaagagctt ctccccggacc ccgggttaggg tcattccagt ctctggacct 720  
 gccagggtgtc tttagccagtc ccgaaacactg ctgaagacca cagatgacat ggtgaagacg 780  
 gccagagaaa aactgaaaca ttattccctgc actgctgaag acatcgatca tgaagacatc 840  
 acacgggacc aaaccagcac attgaagacc tggttaccac tgaactaca caagaacgag 900  
 atttgcctgg ctactagaga gacttcttcc acaacaagag ggagctgcct gcccccacag 960  
 aagacgtctt tggatgtgac cctgtgcctt ggttagcatct atggaggactt gaagatgtac 1020  
 cagacagagt tccaggccat caacgcagca cttcagaatc acaaccatca gcagatcatt 1080  
 cttagacaagg gcatgctggt ggcacatcgat gagctgatgc agtctctgaa tcataatggc 1140  
 gagactctgc gccagaaacc tcctgtggga gaagcagacc cttagaggt gaaaatgaag 1200  
 ctctgcattcc tgcttcacgc cttcagcacc cgcgtcgtga ccatcaacag ggtgatggc 1260  
 tatctgagct ccgcgtcggag cggggccggc gggggccggag gcagcggccg gggcggatcc 1320  
 gccatgtggg tgctggagaa agacgtttat gttgttagagg tgactggac tcccgtgcc 1380  
 cctggagaaa cagtgaacct cacctgtgac acgcctgaag aagatgacat cacctggacc 1440  
 tcagaccaga gacatggagt cataggctct ggaaagaccc tgaccatcac tgtcaaagag 1500  
 tttcttagatg ctggccagta cacctgccac aaaggaggcg agactctgag ccactcacat 1560  
 ctgctgctcc acaagaagga aaatgaaatt tggccactg aaattttaaa aaatttcaaa 1620  
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 tctcgggcag tgacatgtgg aatggcgtct ctgtctgcag agaaggtcac actggaccaa 1800  
 aggactatg agaagtattc agtgtcctgc caggaggatg tcacctgccc aactgccgag 1860  
 gagaccctgc ccattgaact ggcgttggaa gcacggcagc agaataaata tgagaactac 1920  
 agcaccagct tcttcatcg ggacatcatc aaaccagacc cggccaagaa cttgcagatg 1980  
 aagccttga agaactcaca ggtggaggc agctggaggat accctgactc ctggagcact 2040  
 ccccatccct acttctccct caagttctt gttcgaatcc agcgaagaa agaaaagatg 2100  
 aaggagacag aggaggggtg taaccagaaa ggtgcgttcc tcgttagagaa gacatctacc 2160  
 gaagtccaat gcaaaggccg gaatgtctgc gtcaagctc agatcgcta ttacaattcc 2220  
 tcatgcagca agtgggcatg tttccctgc agggtccat ccccggtaa agcaccact 2280  
 tcaagctta cagcggaaagc acagcagcagc cagcagcagc agcagcagca gcagcagcac 2340  
 ctggagcagc tggtgtatgg cctacaggag ctccgtgac ggatggagaa ttacaggaac 2400  
 ctgaaactcc ccaggatgtc cacccatccaa tttacttgc ccaagcaggc cacagaattg 2460  
 aaagatctt agtgcetaga agatgaactt ggacctctgc ggcatgttct ggatttact 2520  
 caaagcaaaa gcttcaatt ggaagatgtc gagaatttca tcaagcaatat cagactaact 2580  
 gttgtaaaac taaagggttc tgacaacaca tttgagtgcc aattcgatga tgagtcaagca 2640  
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 cctcaataa 2709

<210> 14  
 <211> 33  
 <212> DNA  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence: forward primer  
 for PCR amplification of murine p35 subunit of  
 IL-12

<220>  
 <221> misc\_feature  
 <222> (16)..(18)  
 <223> translation initiation codon

<400> 14  
 aagttgcta gcagcatgtg tcaatcacgc tac

<210> 15  
<211> 30  
<212> DNA  
<213> Artificial Sequence  
  
<220>  
<223> Description of Artificial Sequence: reverse primer  
for PCR amplification of murine p35 subunit of  
IL-12

<220>  
<221> misc\_feature  
<222> Complement((10)..(12))  
<223> translation stop codon

<400> 15  
ctcgagcttt caggcggagc tcagatagcc

30

<210> 16  
<211> 61  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: coding  
sequence at the junction between p35 and p40 that  
comprise the murine single-chain IL-12

<220>  
<221> misc\_feature  
<222> (8)..(10)  
<223> encodes the C-terminal amino acid residue of  
murine p35

<220>  
<221> misc\_feature  
<222> (59)..(61)  
<223> encodes the N-terminal amino acid residue of  
mature murine p40

<400> 16  
gagctccgcg tcgagcgggg gcagcggggg cggaggcagc ggcggggcg gatccgcatt 60  
g

61

<210> 17  
<211> 16  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: Protein  
sequence at the junction between p35 and p40 that  
comprise the murine single-chain IL-12

<400> 17  
Ser Ser Gly Gly Ser Gly Gly Gly Ser Gly Gly Gly Ser Ala  
1 5 10 15

<210> 18  
<211> 73  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: coding sequence at the junction between murine p40 and the mature N-terminus of KS heavy chain

<220>  
<221> misc\_feature  
<222> (14)..(16)  
<223> encodes the C-terminal amino acid residue of murine p40

<220>  
<221> misc\_feature  
<222> (71)..(73)  
<223> encodes the N-terminal residue of mature KS heavy chain

<400> 18  
ctgcagggtc cgatccccgg gatccggagg ttcagggggc ggaggttagcg gcggaggggg 60  
ctcctaagg cag 73

<210> 19  
<211> 18  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: protein sequence at the junction between murine p40 and the mature N-terminus of KS heavy chain

<400> 19  
Pro Gly Ser Gly Gly Ser Gly Gly Gly Ser Gly Gly Gly Ser  
1 5 10 15

Leu Ser

<210> 20  
<211> 64  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: coding sequence at the junction between murine p35 and the KS light chain

<220>

<221> misc\_feature  
<222> (8)..(10)  
<223> encodes the C-terminal amino acid residue of  
murine p35

<220>  
<221> misc\_feature  
<222> (62)..(64)  
<223> encodes the N-terminal amino acid residue of the  
light chain

<400> 20  
gagctccgcg tcgagcgggg gcagcggggg cggaggcagc ggccggggcg gatccttaag 60  
cgag 64

<210> 21  
<211> 17  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: protein  
sequence at the junction between murine p35 and  
the KS light chain

<400> 21  
Ser Ser Gly Gly Ser Gly Gly Gly Ser Gly Gly Gly Ser Leu  
1 5 10 15

Ser

<210> 22  
<211> 27  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: forward primer  
for the PCR amplification of murine IL-4

<220>  
<221> misc\_feature  
<222> (9)..(11)  
<223> translation initiation codon

<400> 22  
tctagaccat gggctctcaac cccccagc 27

<210> 23  
<211> 47  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: reverse primer

for the PCR amplification of murine IL-4

<220>  
<221> misc\_feature  
<222> Complement((8)..(10))  
<223> encodes the C-terminal amino acid residue of murine IL-4

<400> 23  
cgatccccgtatccatt tgcatgatgc tcttttaggct ttccagg

47

<210> 24  
<211> 57  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: coding sequence at the junction of murine IL-4 and the mature KS-1/4 light chain

<220>  
<221> misc\_feature  
<222> (1)..(3)  
<223> encodes the C-terminal serine residue of murine IL-4

<220>  
<221> misc\_feature  
<222> (55)..(57)  
<223> encodes the N-terminal amino acid residue of the mature KS-1/4 light chain

<400> 24  
tcgggatccgg gaggttcagg gggcggaggt agcggcggag ggggctcctt aagcgag

57

<210> 25  
<211> 19  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: protein sequence at the junction of murine IL-4 and the mature KS-1/4 light chain

<400> 25  
Ser Gly Ser Gly Gly Ser Gly Gly Ser Gly Gly Gly Ser  
1 5 10 15

Leu Ser Glu

<210> 26  
<211> 27  
<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: forward primer  
for the PCR amplification of murine IL-4

<220>

<221> misc\_feature

<222> (9)..(11)

<223> translation initiation codon

<400> 26

tctagaccat ggggtctcaac ccccaagg

27

<210> 27

<211> 52

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: reverse  
primer for the PCR amplification of murine IL-4

<220>

<221> misc\_feature

<222> Complement((13)..(15))

<223> encodes the C-terminal amino acid residue of  
murine IL-4

<400> 27

cgtatatcccg gacgagtaat ccatttgcat gatgctcttt aggctttcca gg

52

<210> 28

<211> 39

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: coding  
sequence at the junction between murine IL-4 and  
murine GM-CSF

<220>

<221> misc\_feature

<222> (1)..(12)

<223> encodes the C-terminal sequence of muIL4

<220>

<221> misc\_feature

<222> (28)..(39)

<223> encodes the N-terminal sequence of muGM-CSF

<400> 28

atggattact cgtccggat gggaaaagca cccgccccgc

39

<210> 29

<211> 32

<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: forward primer  
for the PCR amplification of murine lymphotactin

<220>  
<221> misc\_feature  
<222> (13)..(15)  
<223> translation initiation codon

<400> 29  
tctagagcca ccatgagact ttccttcctg ac 32

<210> 30  
<211> 26  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: reverse primer  
for the PCR amplification of murine lymphotactin

<220>  
<221> misc\_feature  
<222> Complement((7)..(9))  
<223> encodes the C-terminal amino acid residue of  
murine lymphotactin

<400> 30  
ggatccccca gtcagggtta ctgctg 26

<210> 31  
<211> 57  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: coding  
sequence at the junction between murine  
lymphotactin and KS-IL2 heavy chain

<220>  
<221> misc\_feature  
<222> (1)..(3)  
<223> encodes the C-terminal amino acid residue of  
murine lymphotactin

<220>  
<221> misc\_feature  
<222> (55)..(57)  
<223> encodes the N-terminal amino acid residue of the  
KS-IL2 heavy chain

<400> 31  
cccgatccg gaggttcagg gggcggaggt agcggcggag ggggctcctt aagccag 57

<210> 32  
<211> 17  
<212> PRT  
<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: protein  
sequence at the junction between murine  
lymphotactin and KS-IL2 heavy chain

<400> 32

Gly Ser Gly Gly Ser Gly Gly Gly Ser Gly Gly Gly Ser Leu  
1 5 10 15

Ser